

## AUTHOR INDEX

- Bartholomew, R. P.** Changes in the availability of phosphorus in irrigated rice soils, 209-218.
- Bauer, L. D.**, and Scarseth, G. D. The nature of soil acidity as affected by the  $\text{SiO}_2$ -sesquioxide ratio, 159-173.
- Blair, G. W.** Scott. The conception of flow-plasticity as applied to soils, 291-298.
- Blanck, E.** Handbuch der Bodenlehre, v. 2 (book review), 81.
- Blaney, H. F.**, and Taylor, C. A. Soil sampling with a compressed air unit, 1-3.
- Blaney, J. Eric**, and Smith, John B. Sampling market-garden soils for nitrates, 281-290.
- Bodman, G. B.**, and Perry, Esther P. The interrelationships of certain single-valued soil properties, 365-378.
- Brown, P. E.** *See Thompson, L. G.*, Smith, F. B., and.
- Brown, S. M.** *See Kelley, W. P.*, Dore, W. H., and.
- Carr, R. H.** The modeling of soils, an aid in their study, 487-490.
- Clark, Norman Ashwell**, and Roller, Emery M. The stimulation of *Lemna major* by organic matter under sterile and non-sterile conditions, 299-309.
- Dhar, N. R.** *See Rao, G. Gopal.*
- Dore, W. H.** *See Kelley, W. P.*, and Brown, S. M.
- Eaton, Frank M.** A large sand culture apparatus, 235-241.
- Elliott, Charlotte.** Manual of Bacterial Plant Pathogens (book review), 80.
- Emmert, E. M.** A method of oxidizing and dissolving soil for the determination of total and filtrable manganese and phosphorus, 175-182.
- Fuller, James, E.**, and Rettger, Leo F. The influence of combined nitrogen on growth and nitrogen fixation by *Azotobacter*, 219-234.
- Gilbert, Basil E.**, and Pember, Frederick R. Further evidence concerning the toxic action of aluminum in connection with plant growth, 267-273.
- Greaves, J. Dudley.** A mathematical study of the decrease of crop yields, 115-122.
- Heck, A. Floyd.** Conservation and availability of the nitrogen in farm manure, 335-363; the availability of the nitrogen in farm manure under field conditions, 467-481.
- Hibbard, P. L.** Chemical methods for estimating the availability of soil phosphate, 437-466.
- Honcamp, F.** Ergebnisse der Agrikulturchemie, v. 1 (book review), 82-83.
- Hulbert, Arthur Butler.** Soil (book review), 83.
- Jenny, Hans.** Soil organic matter-temperature relationship in the Eastern United States, 247-252.
- Jensen, H. L.** The fungus flora of the soil, 123-158.
- Kelley, W. P.**, Dore, W. H., and Brown, S. M. The nature of the base-exchange material of bentonite, soils, zeolites, as revealed by chemical investigation and X-ray analysis, 25-55.
- Kreybig, L.** Die Bedingungen der Wirtschaftlichkeit der Handelsdüngemittel (book review), 79.
- Lilleland, Omund.** *See McKinnon, L. R.*
- Lundegårdh, Henrik.** Klima und Boden in ihrer Wirkung auf des pflanzenleben (book review), 81-82.
- McKinnon, L. R.**, and Lilleland, Omund. A method of application designed to insure proper distribution of fertilizers in field trials with fruit trees, 407-411.
- Mattson, Sante.** The laws of soil colloidal behavior. IV. Isoelectric precipitates, 57-77; V. Ion adsorption and exchange, 311-331.
- Mohr, E. C. J.** Tropical Soil Forming Processes and the Development of Tropical Soils (book review), 243.
- Palmer, Harold S.** Soil forming processes in the Hawaiian Islands from the chemical and mineralogical points of view, 253-265.
- Pember, Frederick R. *See Gilbert, Basil E.*
- Perry, Esther P. *See Bodman, G. B.*

- Pierre, W. H.** Hydrogen-ion concentration, aluminum concentration in the soil solution, and percentage base saturation as factors affecting plant growth on acid soils, 183-207.
- Pierre, W. H.**, and Scarseth, G. D. Determination of the percentage base saturation of soils and its value in different soils at definite pH values, 99-114.
- Piland, J. R.** *See Willis, L. G.*
- Pohlman, George Gordon.** Changes produced in nitrogenous compounds by Rhizobium meliloti and Rhizobium japonicum, 385-406.
- Puri, Amar Nath.** Interaction between ammonia and soils, as a new method of characterizing soil colloids, 93-97; a simple method of estimating total exchangeable bases in soils, 275-279.
- Rao, G. Gopal**, and Dhar, N. R. Photo-sensitized oxidation of ammonia and ammonium salts and the problem of nitrification in soils, 379-384.
- Rayner, M. C.** Mycorrhiza (book review), 80-81.
- Rettger, Leo F.** *See Fuller, James E.*
- Richter, Charles.** The temperature correction in the hydrometer method of mechanical analysis of soils, 85-92.
- Roller, Emery M.** *See Clark, Norman Ashwell.*
- Salter, Frederick J.** The carbon-nitrogen ratio in relation to the accumulation of organic matter in soil, 413-430.
- Scarseth, G. D.** *See Baver, L. D.*
- Scarseth, G. D.** *See Pierre, W. H.*
- Schollenberger, C. J.** Determination of soil organic matter, 483-486.
- Schucht, Friedrich.** Grundzüge der Bodenkunde, 79.
- Smith, F. B.** *See Thompson, L. G.*, and Brown, P. E.
- Smith, John B.** *See Blaney, J. Eric.*
- Smith, Nathan R.** Felix Löhnis, 333-334.
- Stebutt, Alexander.** Lehrbuch der allgemeinen Bodenkunde (book review), 84.
- Taylor, C. A.** *See Blaney, H. F.*
- Thomas, Stanley.** Bacteriology (book review), 82.
- Thompson, L. G.**, Smith, F. B., and Brown, P. E. Phosphorus assimilation by soil microorganisms, 431-436.
- Waksman, S. A.** Martinus Willem Beijerinck, 245-246.
- Willcox, Oswin W.** Principles of Agrobiology, or the Laws of Plant Growth in Relation to Crop Production (book review), 243-244.
- Willis, L. G.**, and Piland, J. R. Ammonium calcium balance: A concentrated fertilizer problem, 5-23.

## SUBJECT INDEX

- Actinomycetes, relation to—  
alfalfa decomposition, 149.  
casein decomposition, 148.  
cellulose decomposition, 146.  
H-ion concentration of soil, 130, 137.
- Agricultural chemistry, contributions of, 82.
- Agrobiology, Principles of, a book, 243.
- Alanine, changes produced in, by Rhizobium, 392.
- Alfalfa meal, effect on—  
actinomycetes, 149.  
bacteria in soil, 149.  
fungus flora, 149.
- Aluminum—  
active, in acid soils, 269.  
factor in plant growth, 183.  
humates of, 59.  
isoelectric—  
“phospho-humate” and “silico-humates,” 66.  
phospho-silicates, 69, 317, 318.  
method of determining, 188.
- oxide as photosensitizer of ammonia, 383.
- silicate, exchange reactions in, 324.
- toxic action of, 267-273.
- Amino benzoic acid, changes produced in, by Rhizobium, 397.
- Amino-n-butyric acid, changes produced in, by Rhizobium, 393.
- Ammonia—  
nitrogen in manure, 351.  
oxidation of, 379, 381.  
photosensitizers in the oxidation of, 381.  
soils and, interaction between, 93.
- Ammonium—  
calcium balance, 5-23.  
carbonate—  
effect on nitrogen fixation by Azotobacter, 226.  
oxidation of, 380.
- chloride—  
effect on nitrogen fixation by Azotobacter, 226.  
oxidation of, 380.
- nitrate, effect on nitrogen fixation by Azotobacter, 226.
- phosphate—  
effect on nitrogen fixation by Azotobacter, 226.  
oxidation of, 380.
- sulfate—  
changes produced in, by Rhizobium, 400.  
effect on nitrogen fixation by Azotobacter, 226.  
oxidation of, 380.
- toxicity of, salts, 12.
- Asparagine, changes produced in, by Rhizobium, 388, 398.
- Aspartic acid, effect on N fixation by Azotobacter, 226.
- Aspergillus, phosphorus assimilation by, 433.
- Azotobacter—  
ammonia nitrogen in fluid cultures of, 229.  
nitrogen fixation by, as affected by combined nitrogen, 219-234.  
phosphorus assimilation by, 433.  
proteolytic activity of, 225.
- Bacteria—  
as affected by dextrose, 141.  
effect on Lemma major reproduction, 305.
- legume, changes produced by, in nitrogenous compounds, 385-406.
- relation to—  
alfalfa decomposition, 149.  
casein decomposition, 148.  
cellulose decomposition, 146.  
H-ion concentration of soils, 130, 137.
- Rhizobium meliloti and Japonicum, effect on N compounds, 385.
- Bacto-peptone, effect on N fixation by Azotobacter, 226.
- Barley—  
experiments with manure on, 468.  
nitrogen content of, 471.
- Base—  
anion exchange as related to, exchange, 325.  
exchange upon application of potash fertilizer, 408.  
saturation as factor of plant growth in acid soils, 183.

- Base-exchange—*see also* Ion exchange.  
 as affected by—  
   grinding materials, 26.  
   heat, 41.  
 capacity—  
   and exchangeable bases, two concepts, 96.  
   relation to silica-sesquioxide ratio, 166.  
 cation, capacity of various complexes, 311.  
 chemical investigations, 25–55.  
 complex, crystalline nature of, 42.  
 in—  
   beidellite, 29.  
   bentonite, 25.  
   natrolite, 41.  
   scolecite, 41.  
   soils, 25.  
   stilbite, 41.  
   zeolites, 25, 39.  
 methods, reliability of, 171.  
 nature of, 25–55.  
 X-ray analysis, 25.
- Bases—  
 exchangeable—  
   base-exchange capacity and, 95.  
   method of estimating, in soils, 275–279.  
 hydrogen-ion concentration and exchangeable, 99.  
 replaceable, increase of, due to irrigation, 217.  
 saturation of soils with, determination of, 99–114.
- Beidellite, base-exchange in, 29.  
 Beijerinck, Martinus Willem, an obituary note, 245.
- Bentonite—  
 base-exchange in, 25.  
 isoelectric pH of and sesquioxides, 74.
- Bluegrass, C-N ratio in, 418.
- Buckwheat, as affected by manure, 344.
- Calcium—  
 ammonium balance, 5–23.  
 antagonism to toxicity, 16.  
 carbonate, effect on ammonia injury to plants, 15.  
 replacing power with respect to magnesium, 44.
- Carbon—  
 dioxide, losses in fermenting manure, 354.  
 nitrogen ratio in—  
   bluegrass, 418.  
   cellulose, 418.  
   corn stover, 418.
- glucose, 418.  
 organic matter in soils, 413–430.  
 ragweeds, 418.  
 red clover, 418.  
 straw, 418.  
 sweet clover, 418.  
 tobacco stems, 418.  
 wood-fiber, 418.
- Casein—  
 decomposition of, 147  
 effect on—  
   actinomyces, 148.  
   bacteria, 148.  
   fungi, 148.
- Cation exchange capacity of various complexes, 311.
- Cellulose—  
 carbon-nitrogen ratio in, 418.  
 decomposition of, 142, 146.  
 effect on—  
   actinomyces flora, 146.  
   bacterial flora, 146.  
   fungus flora, 143.
- Clay content, determination of, 366.
- Clover—  
 red, C-N ratio in, 418.  
 sweet, C-N ratio in, 418.
- Colloid—  
 amphoteric, Donnan equilibrium in, 326.  
 content determination by adsorption, 366.  
 Donnan equilibrium in an amphoteric, 326.  
 sesquioxide-soil system, 71.
- Colloidal—  
 clay acids, titration curves, 162–166.  
 content by adsorption, 365.  
 laws of soil, behavior 57–77, 311–331.
- Colloids—  
 charge on, factors involved, 59–66.  
 isoelectric aluminum "phospho-humate" and "silico-humates," 66.  
 sodium-humate, 58.
- Corn—  
 as affected by manure, 344.  
 carbon-nitrogen ratio in, 418.
- Cotton, toxicity of fertilizers to, seedlings, 8.
- Creatinine, effect on N fixation by Azotobacter, 226.
- Crop, mathematical study of the decrease of, yields, 115–122.
- Culture solution, *see* Nutrient solutions.
- Cysteine hydrochloride, effect on N fixation by Azotobacter, 226.

- Cystine—  
  changes produced in, by Rhizobium, 395.  
  effect on N fixation by Azotobacter, 226.
- Dextrose, decomposition of, in acid and limed soils, 142.
- Donnan equilibrium in an amphoteric colloid, 326.
- Fertilizer—  
  ammonium calcium balance, 5-23.  
  commercial, the economy of, 79.  
  concentrated, mixture, injurious effects of, 9.  
  effect on microorganisms in soils, 139.  
  toxicity of, 7.
- Fertilizers—  
  for fruit trees, 407.  
  method of application to insure proper distribution, 407-411.  
  penetration of, in soils, 408.
- Fungi—*see also* Molds  
  composition of soil flora, 128.  
  decomposition of various substances by, 140.  
  direct isolation of, 124.  
  number of, in soil, 129.  
  proteolytic power of, 150.  
  relation to—  
    alfalfa decomposition, 149.  
    casein decomposition, 148.  
    cellulose decomposition, 146.  
    humus content, 130.  
    liming, 134.  
    physical character of soil, 130.  
    soil reaction, 130, 137.  
  soil, flora, 123.
- Glucose, C-N ratio in, 418.
- Glutamic acid—  
  changes produced in, by Rhizobium, 394.  
  effect on N fixation by Azotobacter, 226.
- Glycocol—  
  changes produced in, by Rhizobium, 391.  
  effect on N fixation by Azotobacter, 226.
- Guanine, effect on N fixation by Azotobacter, 226.
- Hydrogen, replaceable, method of determining, 100.
- Hydrogen-ion concentration—  
  factor in plant growth on acid soils, 183-207.  
  relation to—  
    actinomycetes in soil, 130.  
    bacteria in soil, 130.  
    exchangeable bases, 99, 103, 108.
- fungus flora in soil, 130.  
potassium-calcium ratio in soil solution, 198.
- Hydrometer—  
method of mechanical analysis of soils, 85.  
temperature correction in, method, 85.
- Humates—  
cation exchange capacity of, 330.  
electrical charge of, factors involved, 61.  
isoelectric, of Al and Fe, 59, 313.
- Humus, fungus flora and, 130.
- Ion exchange—  
isoelectric point and, 323.  
mechanism of, 315.
- Iron—  
humates, 59.  
isoelectric phospho-silicates, 69.
- Irrigation—  
aluminum in, water, 210.  
calcium in, water, 210.  
effect on—  
  availability of phosphorus, 214.  
  soil reaction, 212.  
iron in, water, 210.  
water for rice, 209-212.
- Isoelectric—  
point and ion exchange, 323.  
precipitates of colloids, 57-77.
- Lemna major, stimulation of, by organic matter, 299.
- Lettuce—  
sensitivity to aluminum toxicity, 270.  
soils, phosphorus in, 181.
- Lime, effect on—  
dextrose decomposition, 142.  
plasticity of soils, 293.
- Löhnis, Felix, an obituary note, 333.
- Magnesium, replaceable, 26.
- Manganese—  
determination of, in soil, 175.  
relation to plant injury from soil acidity, 205.
- Manure—  
acids volatile, losses from, 354.  
ammonia losses from fermenting, 354.  
barley experiments with, 468.  
carbon losses from, 354.  
composition of, with respect to nitrogen, 335.
- effect on—  
nitification, 474.  
tillering of barley, 472.

- farm, conservation and availability of  
  nitrogen in, 335-363.  
liquid, storage of, 338.
- nitrogen—**  
  availability of, under field conditions,  
    467-481.  
  conservation of, 337.  
  recovery in crops, 345.  
  reaction of cow, 351.  
  storage of, changes produced, 350.
- Microorganisms, soil, phosphorus assimilation by,** 431-436.
- Mineralogical interpretation of rock analyses,** 259.
- Moisture-equivalent in soils,** 370-376.
- Molds, phosphorus assimilation by,** 431;  
  *see also Fungi.*
- Mycorrhiza,** 80.
- Natrolite, base-exchange in,** 41.
- Nitrate—**  
  data for different cropping conditions, 288.  
  nitrogen in—  
    soil fallow, 284, 471.  
    soils treated with various organic  
      materials, 423.
- Nitrates—**  
  in market-garden soils, 281.  
  statistical methods in studying, 282.
- Nitrification—**  
  chemical nature of, 379.  
  in soils, 379.  
  on—  
    fallow soil, 474.  
    manured soil, 474.
- Nitrite formation as affected by anions,** 380.
- Nitrogen—**  
  ammonia in—  
    fluid cultures of Azotobacter, 228.  
    manure, 351.  
  availability of, in farm manure, 335, 339.  
  effect on Azotobacter growth and N fixation, 219, 226.  
  fixation by Azotobacter, 219.  
  losses of, in handling manure, 338.  
  materials, decomposition of, by fungi, 147.  
  nitrate, under fallow and crops, 284.  
  recovery from crops, 345.
- Nucleic acid, effect on N fixation by Azotobacter,** 226.
- Nutrient solution—**  
  lettuce grown in, 268.  
  sand cultures for, 236.
- Oats, as affected by manure,** 344.
- Organic—**  
  carbon in soils treated with various  
    organic materials, 421.  
  materials, composition of, 418.
- matter—**  
  accumulation in soils, relation to C:N,  
    413.  
  determination of soil, 483-486.
- Lemna major, stimulation of, by,** 299-309.
- method of calculating average, content,** 249.
- temperature relationship in the E. United States,** 247-252.
- nitrogen in soils treated with various organic materials,** 420.
- Peptone, changes produced in, by Rhizobium,** 389.
- Permutite, X-ray pattern of,** 40.
- Phenylalanine, changes produced in, by Rhizobium,** 397.
- Phosphates—*see also Soil phosphorus, phosphate, Soils phosphate.***  
  acetic acid extract of, 445.  
  availability of soil, 448, 455.  
  citric acid extract of, 442.  
  exchange of, with humate ions, 77.  
  extraction with acids, relation to pH, 441.  
  hydrochloric acid extract of, 442.  
  oxalic acid extract of, 442.  
  percolation method of extracting, 449.  
  size of particles and amount of, 457.  
  soil, chemical method for estimating  
    availability, 437-466.  
  solubility of, with various solvents, 455, 459.  
  toxicity of, 12.
- Phosphorus—**  
  assimilation of, by soil microorganisms,  
    431.  
  availability of, in irrigated soils, 209.
- method—**  
  comparison of, 178.  
  determining, in soil, 175.
- Photosensitized oxidation of ammonia,** 379.
- Plant—**  
  growth—  
    aluminum toxicity to, 267.  
    factors affecting, in acid soils, 183-207.  
    injury from soil acidity, 190.  
    pathogens, manual of, 80.
- Potassium—**  
  nitrate—  
    changes produced in, by Rhizobium, 401.

- effect on nitrogen fixation by Azotobacter, 226.
- Ragweed, C-N ratio in, 418.
- Rhizobium, *see* Bacteria legume.
- Rice soils, availability of phosphorus in, 209.
- Rocks—  
chemical changes during weathering of, 255.  
weathering of in tropics, 254.
- Rothamsted field data analyzed, 117.
- Sand cultures, apparatus for large, 235-241.
- Scolecite, base-exchange in, 41.
- Sesquioxide-soil colloid systems, 71, 159.
- Silica as photosensitizer in ammonia oxidation, 383.
- Silicate, replacement of ions, by humates, 77.
- Silica-sesquioxide ratio, relation to—  
base-exchange capacity, 110, 166, 320.  
soil acidity, 159-173.
- Sodium—  
humate colloids, preparation of, 58.  
nitrate, effect on nitrogen fixation by Azotobacter, 226.
- Soil—  
a textbook on, 83.  
acidity, nature of, as affected by  $\text{SiO}_2\text{-R}_2\text{O}_5$  ratio, 159-173; *see also* Soils acid, reaction, H-ion concentration, Lime. analyses from mineralogical data, 254.  
apparatus for sampling, 1-3.  
buffer power of the, in relation to solubility of phosphate, 440.  
Cecil clay, description of, 185.  
Cecil clay loam, description of, 185.  
Cecil sandy loam, description of, 185.  
Colby silt loam, description of, 185.  
colloids—*see also* Colloids.  
ammonia method for characterizing, 93-97.  
as affected by grinding, 28.  
base-exchange of, as affected by grinding, 28.  
Cecil, nature of, 43.  
fusion analysis of, 31.  
silica-sesquioxide ratio, review of literature on subject, 159.  
colloids, silica-sesquioxide ratio, relation to—  
acidity, nature of, 159.  
base-exchange capacity of, 110, 320.  
Cory silt loam, description of, 185.
- fallow—  
nitrate nitrogen in, 284, 471.  
nitrification in, 474.
- forming processes—  
in the Hawaiian Islands, 253-265.  
in the tropics, a monograph on, 243.  
mineralogical point of view, 253-265.  
weathered shells and rock analyses to illustrate, 254.
- fungus flora of the, 123-158; *see also* Fungi.
- Greenville fine sandy loam, description of, 185.
- Greenville sandy loam, description of, 185.
- Grundy silt loam, description of, 185.
- manganese determination in, 175.
- Miami silt loam, description of, 185.
- microorganisms, *see* Microorganisms.
- moisture penetration, method of studying, 1-3.
- Norfolk sandy loam, description of, 185.
- organic matter, *see* Organic matter.
- oxidizing and dissolving, 175.
- phosphate—*see also* Phosphorus, Phosphates.  
chemical method of determining availability, 437.
- solubility of, in various solvents, 459.
- phosphorus determination in, 175; *see also* Phosphorus, Phosphates.
- plastic range of the, 369.
- profile, plasticity studies of the, 294.
- properties, single-valued, 365-378.
- reaction, as affected by irrigation, 212; *see also* Acidity.
- rolling out limit of, 369.
- sampling with a compressed air unit, 1-3.
- science—  
fundamentals of, 79.  
textbook, 84.
- solution—  
aluminum concentration in, affecting plant growth, 183.  
calcium-potassium ratio in, 198.  
H-ion concentration of, affecting plant growth, 183.  
sticky-point in, 369.
- Susquehanna fine sandy loam, description of, 185.
- type, flow-plasticity as related to, 295.
- Soils—  
a handbook of, 81.

- acid—*see also* H-ion concentration.  
decomposition of dextrose in, 142.  
plant growth in, 183.
- ammonia interaction with, 95.
- base-exchange, *see* Base-exchange.
- base saturation of, determination of, 99, 205.
- Hawaiian, mineralogical composition, 253-265.
- irrigated, availability of phosphorus in, 209-218.
- lettuce, phosphorus in, 181.
- market-garden, sampling for nitrates, 281-290.
- mechanical analysis of, by hydrometer method, 85-92.
- modeling of, an aid in their study, 487-489.
- nitrification in, 379-384.
- organic matter in, *see* Organic matter.
- phosphate—*see also* Phosphorus, Phosphates.  
extraction of, by acids, 458.  
supplying power of, 457.  
Wrangell's work on, 459.
- photochemical oxidation in, 382.
- plasticity of, 291-298.
- rice, water soluble phosphorus in, 213.
- saturation of, as factor of plant injury, 205.
- sticky-point of, 295, 369.
- tomato, manganese and phosphorus in, 180.
- tropical, monograph on, 243.
- Sticky-point, determination of, 369.
- Stillbite, base-exchange in, 41.
- Straw—  
effect on manure storage, 357.  
C-N ratio in, 418.
- Uranium salts as photosensitizer in ammonia oxidation, 383.
- Urea—  
changes produced in, by Rhizobium, 388, 399.  
effect on N fixation by Azotobacter, 226.
- Urine, reaction of cow, 351.
- Wood-fiber, C-N ratio in, 418.
- X-ray—  
analysis to determine base-exchange, 25-55.  
permutite pattern, 40.  
studies on zeolites, 40.
- Zeolites—  
base-exchange in, 25, 39.  
X-ray studies on, 40.
- Zinc as a photosensitizer in ammonia oxidation, 383.

